A Dissertation on

A STUDY ON SECONDARY NECK NODES FROM SQUAMOUS CELL CARCINOMA

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CERTIFICATE

This is to certify that **"A STUDY ON SECONDAY NECK NODES FROM SQUAMOUS CELL CARCINOMA"** is bonafide work done by **Dr. A.MARTIN PANIRAJ**, Enrollment No. post graduate student, Department of General Surgery, Kilpauk Medical College, Chennai-10, under my guidance and supervision in partial fulfillment of regulations of **The Tamilnadu Dr.M.G.R.Medical University** for the award of **M.S.Degree Branch I, Part II (General Surgery)** during the academic period from May 2006 to March 2009

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CONTENTS

INTRODUCTION

Squamous cell carcinoma of the head and neck especially those arising in the oral cavity and oropharynx account for more than 50 percent of all cancers in India compared to 2 to 3 percent in U.K. and U.S.A. More than 30 percent of these patients have clinical evidence of cervical node metastases when first seen.

The presence of an enlarged node proven histological positive for metastases is an ominous sign and as a general rule decreases the 5 year survival rate by at least 50 percent. When the nodal involvement becomes multiple and extends low in the neck, few patients get cured regardless of treatment given.

No definite conclusions about the efficacy of treatment of the neck in the absence of palpable nodal disease can be drawn from studies from literatures. But many indicate improved survival for those undergoing therapeutic neck treatment for occult disease versus those undergoing therapeutic neck treatment for clinically positive nodes. Spiro and strong reported significantly better (p less than 0.06) survival for patients undergoing elective neck treatment for oral and oropharyngeal cancers who had clinically negative but histologically positive nodes ,compared to patients undergoing therapeutic neck dissection for clinically positive nodes.

Because there is currently no way to identify occult disease in the cervical nodes other than removing and examining them histopathologically, various features of the primary tumor (viz. site, size, gross appearance thickness, and differentiation)have been correlated with incidence of nodal disease in the neck by different workers.

In the present study an attempt has been made to determine the tumor factors increase the propensity for regional metastases in squamous cell carcinoma of the head and neck, so as to help, identify the cluster of high risk patients who are likely to harbor occult nodal disease in the absence of clinically negative nodes and for whom elective neck treatment may prove beneficial.

9 areas of the head and neck including 5 primary sites in the oral cavity, 3 in the oropharynx and the maxillary antrum have been considered under the preview of this study, as these were the sites involved in the patients presenting with squamous cell carcinoma of the head and neck in the surgical department of our hospital.

AIM OF STUDY

1) To correlate the incidence of cervical node metastases by the site of primary in squamous cell carcinoma of the head and neck region

2) To find out the incidence of cervical node metastases.

3) To describe the distribution of cervical node metastases by the site of the primary

4) To correlate individually the size of the tumor and its degree of histopathological differentiation

5) To find the incidence of nodal metastases commonly involved according to the primary tumor at the time of presentation.

Historical Background

Although the gruesome habit of excising the tongue for torture or punishment is as old as man, the ancient medical manuscript contains little reference to the surgical treatment of head and neck cancer. Marchette had performed excision of tongue cancer as early as 1664; however the first modern attempt to treat cancer of the head and neck by surgical excision was accomplished with Billroth's total laryngectomy for cancer in 1873.

At this time, it was widely held that once the tumor has spread to the cervical node, a cure were impossible. Even when it has not, the result of surgery for control of the primary were more horrifying than gratifying. Extensive surgery in a septic field and without antibiotics produced a postoperative complication rate of sepsis and death close to 100%. Few patients fortunate enough to survive the initial operation, metastatic disease develop subsequently in the neck.

Warren in 1847 had described an operation for the removal of metastatic nodes from the upper neck. In 1885, Hendry Butlin operated on cancer of the tongue in which he excised the mandible and the lymphatic contents of anterior triangle of the neck along with the primary. But it was not until1906 that Crile

Presented a paper entitled “Excision of cancer of the head and neck”, and propounded a systematic operative procedures for removal of cervical lymphatic based on anatomic principles.

In this “Radical neck Dissection”, he removed all the lymphatics from the anterior and posterior triangles of the neck along either internal jugular vein or sternocleidomastoid muscle. In his initial report in 132 operations, he related curability to the magnitude of surgical resection and concluded that dissection block was indicated regardless of whether nodes are clinically palpable or not. If no nodes were palpable, he advised excision of the immediate lymphatic areas. Radical neck dissection was recommended in the presence of the palpable lymph nodes.

Crile’s procedure was quite formidable in the settings of the early 1900s because of the risk of the infection and hemorrhage. Neither antibiotics nor blood substances (Landsteiner) had been discovered yet. Thus a reasonable alternative to surgery seemed to emerge when Curie introduced radiation therapy for cancer.

As this is true with new modality, it was used with great enthusiasm and most radical operations for the head and neck cancers were abandoned in the favor of radiotherapy till the end of the 1930s. However over enthusiasm produced discouraging results. Drawbacks of radiotherapy gradually became apparent with increasing numbers of radio

necrosis and radio resistant tumors. The realization of the fact was that gross metastatic diseases in the neck did not respond well to irradiation as to surgery.

With the introduction of endotracheal anesthesia, liberal use of blood transfusion and availability of antibiotics in 1940s, the pendulum swing back in the favor of surgery. Hayers Martin of memorial hospital, Newyork a combined operation for resection of the primary lesion and the cervical nodes in a single block including mandibulectomy that come to be known as the “Commando procedure”. Like Crile and Halsted, he told that lymph nodes constituted a protective barrier that for a time confine metastatic growth to an area accessible to treatment, and that once beyond this barrier cancer of the head and neck was hopelessly advanced. Therefore the degree to which regional metastases could be prevented or controlled was main factor that determined the patients’ prognosis.

Meanwhile as Martin was developing his commando operation, radiation therapy acquired sophistication with the successive introduction of fractionated therapy (Coutard 1937 and Baclesse 1949), super voltage irradiation and linear accelerators. These were able to reduce considerably the morbidity of the radiotherapy, leaving a field more suitable for surgery when this was required.

Radiotherapists and Surgeons who had been despairing the results of each others treatment and advancing their own techniques as the primary treatment of the head and neck cancers were able to find as common ground for both methods with realization that there were patients who could benefit from both modalities if given as a planned course of an integrated treatment.

REVIEW OF LITERATURE

a DISCUSSION AND REVIEW OF LITERATURE

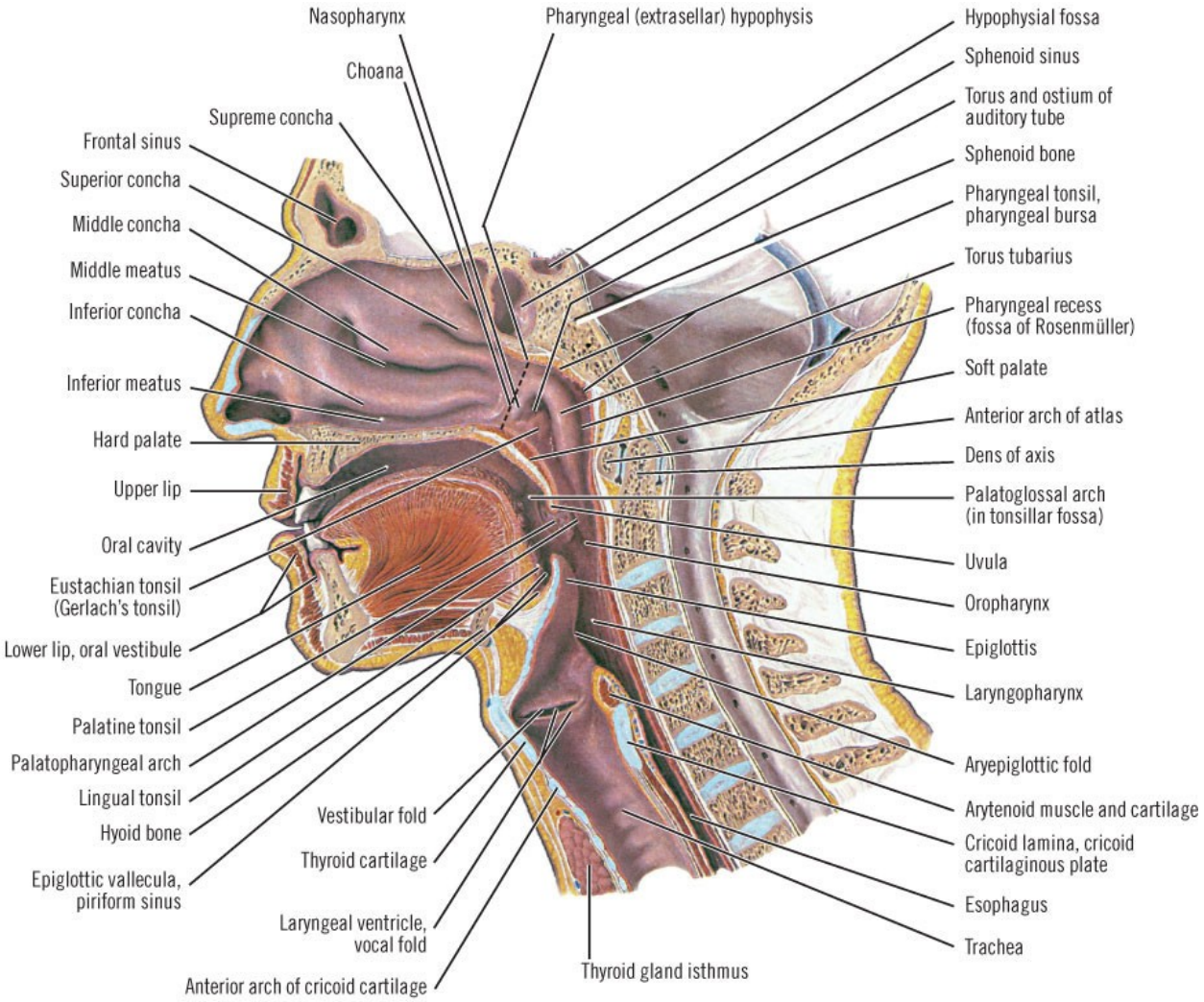
TOPOGRAPHIC ANATOMY OF THE HEAD AND NECK

The major sites of the upper aero-digestive tract affected by head and neck cancer are the oral cavity, pharynx, paranasal sinuses, larynx, thyroid gland, and salivary glands. The oral cavity extends from the skin-vermilion junction of the lips to the junction of the hard and soft palate above and the line of the circumvallate papillae below. It is divided into specific sub sites: lip, buccal mucosa, lower and upper alveolar ridges, retro molar trigone, floor of the mouth, hard palate and anterior two thirds of the tongue (oral tongue). Usually, lymphatic drainage from the oral cavity is orderly, and metastatic spread to the neck generally occurs in a predictable and stepwise fashion.

The first-station cervical lymph nodes for anterior sites in the oral cavity are the level I nodes (submental and submaxillary), and metastasis then proceeds to levels II (upper deep cervical nodes) and III (middle deep cervical nodes). Lymphatic metastases from the tongue can involve the jugulodigastric nodes at level II or the juguloomohyoid nodes at levels III and IV directly, without involvement of the intervening levels.

The pharynx is divided into the nasopharynx, the oropharynx, and the hypopharynx The oropharynx includes the base of the tongue, vallecula, soft

SAGGITAL SECTION OF AERODIGESTIVE TRACT

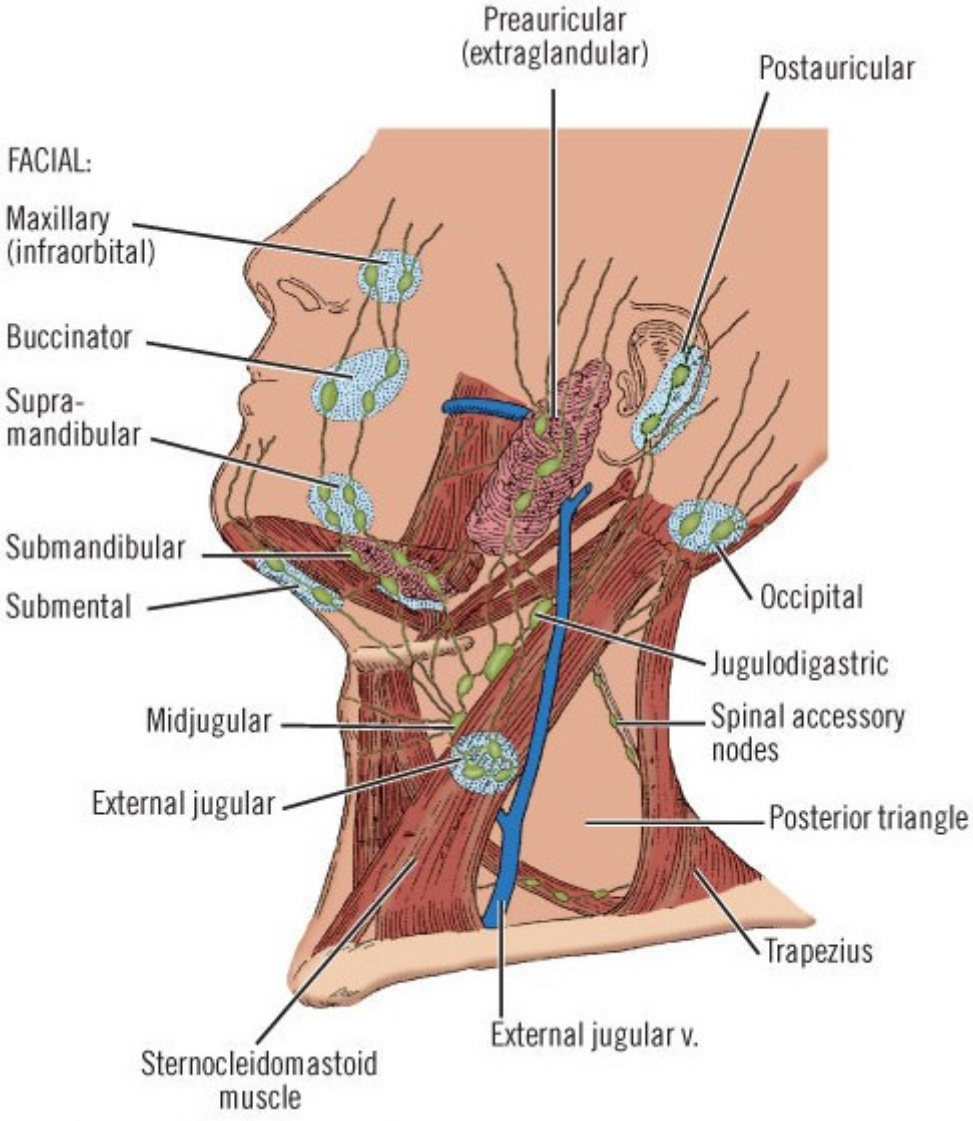


palate, tonsil and tonsillar fossa, and posterior pharyngeal wall. The region of the nasopharynx extends from the level above the junction of the hard and soft palate to the base of the skull. The hypopharynx includes three areas: the pyriform sinus, the posterior pharyngeal wall extending from the level of the vallecula to the level of the cricoarytenoid joints, and the postcricoid area, which extends from the level of the arytenoids cartilages to the inferior border of the cricoid cartilage.

The main routes of lymphatic drainage from the pharynx depend on the site of a primary tumor: The nasopharynx drains into the nodes of the upper part of the posterior triangle, the oropharynx to nodes at level II (jugulodigastric and upper deep cervical), and the hypopharynx to nodes at levels II, III (middle deep cervical), and IV (lower deep cervical).

Some primary sites (e.g., the base of tongue) have a propensity to bilateral lymphatic metastasis, a tendency common also in lesions that involve or approach the midline. Tumor (T) staging of lesions at some sites (e.g., the nasopharynx and hypopharynx) takes into account the number of sub sites involved in contrast to tumors of the oral cavity and oropharynx, which are staged according to the size of the lesion, mainly because of the difficulty in measuring the exact extent of lesions at these sites.

CERVICAL LYMPH NODES



Anatomically, lesions of the larynx are classified as supraglottic, glottic, and subglottic. Primary tumors of the subglottic region are extremely rare (approximately1% of laryngeal tumors) in contrast to the much more common occurrence of a glottic tumor extending into the subglottis. The true vocal cord (glottis) has a very sparse lymphatic network; consequently, lymphatic metastases are uncommon. However, when glottic tumors extend to involve the adjacent supraglottic or subglottic areas, they have a high propensity to metastasize to the jugular chain and trachea esophageal groove lymph nodes. The supraglottic larynx has a rich lymphatic drainage, and tumors of this region often metastasize bilaterally.

The nasal cavity extends from the vestibule anteriorly to the nasopharynx posteriorly and from the nasal septum medially to the turbinates laterally. The middle meatus, which lies between the middle and inferior turbinates, drains the frontal, maxillary, and ethmoid sinuses. Blockage of these openings by tumor may cause symptoms of sinusitis and radiologic opacification of the sinuses.

Cancer of the maxillary sinus is the most common paranasal sinus tumor. Other sites affected in this region include the ethmoid sinuses, nasal cavity, and sphenoid sinus. Neoplasms of the sphenoid and frontal sinuses are

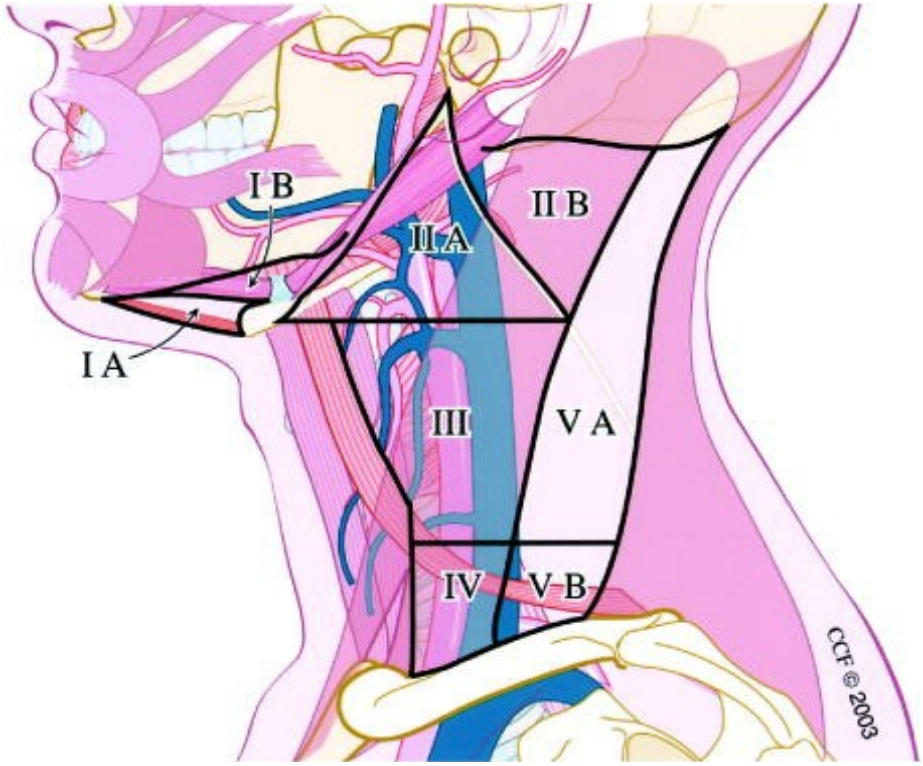
very rare. The maxillary antrum is divided into an anteroinferior (infrastructure) and a superoposterior portion (suprastructure) by an imaginary plane—Ohngren's line—joining the medial canthus of the eye to the angle of the mandible. Infrastructure tumors generally are treated by partial maxillectomy and rehabilitation generally involves the use of prosthetic obturators.

In contrast, tumors of the suprastructure are in closer proximity to the orbit and skull base, and their treatment involves additional considerations, including resection and reconstruction of the orbital floor and management of the eye itself. Approximately 15% of patients with tumors of the maxillary sinus will present with metastases to the regional lymph nodes at levels I (submandibular) and II (upper deep cervical).

Patterns of Lymph Node Metastasis

The regional lymphatic drainage of the neck is divided into seven levels. These levels allow for a standardized format for radiologists, surgeons, pathologists, and radiation oncologists to communicate concerning specific sites within the neck and do not represent regions isolated by fascial planes. The cervical lymphatic nodal basins contain between 50 to 70 lymph nodes per side and are divided into seven levels.

CERVICAL LYMPH NODES LEVEL



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Level I is divided into IA bounded by the anterior belly of the digastric muscle, the hyoid bone, and the midline, whereas level IB is bounded by the anterior and posterior bellies of the digastric muscle and the inferior border of the mandible. Level IB contains the submandibular gland.

Level II is bounded superiorly by the skull base, anteriorly by the stylohyoid muscle, inferiorly by a horizontal plane extending posterior from the hyoid bone, and posteriorly by the posterior edge of the sternocleidomastoid muscle. Level II is further divided into level IIA, which is anterior to the spinal accessory nerve and level IIB or the "submuscular triangle" which is posterior to the nerve.

Level III begins at the inferior edge of level II and is bounded by the laryngeal strap muscles anteriorly, the posterior border of the sternocleidomastoid muscle posteriorly, and by a horizontal plane extending posteriorly from the inferior border of the cricoid cartilage.

Level IV begins at the inferior border of level III and is bounded anteriorly by the strap muscles, posteriorly by the posterior edge of the sternocleidomastoid muscle, and inferiorly by the clavicle.

CARCINOMA TONGUE

CARCINOMA CHEEK

Level V is posterior to the posterior edge of the sternocleidomastoid muscle, anterior to the trapezius muscle, superior to the clavicle, and inferior to the base of skull.

Level VI is bounded by the hyoid bone superiorly, the common carotid arteries laterally, and the sternum inferiorly. Although level VI is large in area, the few lymph nodes it contains are mostly in the paratracheal regions near the thyroid gland.

Level VII (superior mediastinum) lies between the common carotid arteries and is superior to the aortic arch and inferior to the upper border of the sternum.

MATERIALS AND METHODS

During a period of 24 months from June 2006 to May 2008, data were collected from 70 patients who were admitted in the surgical units of Kilpauk Medical College and Hospital and Govt. Royapettah Hospital Chennai with clinical diagnosis of carcinoma arising in the oral cavity, oropharynx or maxillary antrum. A total of 60 patients were ultimately included in the study and all had histologically proven squamous cell carcinoma of varying degrees of differentiation. The patients who were not included in this study were 7 for want of one reason or other for e.g. Biopsy report one case reported as pseudoepithelimatous hyperplasia without any evidence of malignancy, one case reported as adenocarcinoma arising from ulcer in the lower lip, another case involving the buccal mucosa was adenoid cystic carcinoma.

The work up for all patients on admission was as follows:

A detailed history was obtained regarding the nature and duration of presenting complaints as well as of all other associated complaints particular attention being paid to factors increasing the likelihood of malignancy e.g. White or red patch in the oral cavity, non healing ulcer, throat pain more than 3 weeks duration , non tender enlarging neck mass , pressure symptoms or obstructive symptoms , or addiction to tobacco,

alcohol, betel leave chewing, snuff dipping, irradiation to head and neck in the past, past treatment of other head and neck carcinomas.

Complete physical examination including an indirect laryngoscopy in selected cases was done to note characteristics of the primary in terms of site, extent, size(in cm.), macroscopic appearance(exophytic, endophytic, or mixed), degree of local infiltration, presence of other synchronous lesions and T stage of tumor.

Attention was then paid to the neck to detect any palpable nodes. The criterion for “a clinically positive node” as defined by Lindberg was used to differentiate metastatic from nonmetestastic nodes throughout the study. Any palpable node more than 1cm in size, spherical rather than ovoid in shape, hard in consistency and situated in the drainage area of a histologically proven primary was considered as metastases.

Note was made of the side and triangle of the neck involved, the total number of palpable nodes, the groups involved, size(in cm),consistency, presence of tenderness, fixity to the skin as well as node and N stage of the nodes.

When nodes belonging to deep cervical chain were enlarged, they were included in anterior cervical triangle with regard to their position, as the classical description of the cervical triangle excludes the nodes deep

to sternocleidomastoid muscles from either of two major triangles. Midline nodes were considered as homolateral nodes. In evaluating the size of the nodal mass, allowances made for the intervening soft tissue.

Biopsy from the primary site was obtained in all the cases included in the study to obtain histological proof regarding its nature as well as to note its degree of differentiation. The latter was expressed in terms of three grades, well differentiated, moderately differentiated, and poorly differentiated.

RESULTS

Sex distribution

Out of 60 patients with histologically proven squamous cell carcinoma arising from various primary sites in the head and neck who were ultimately included in the study. 35(58%) were males and 25(42%) were females. Palpable neck nodes were detected on admission in 30 males (68%) and 14 females (32%)

Age distribution

The overall incidence of patients with head and neck squamous cell carcinoma was in the age group of 30 – 70 years

TABLE- I

INCIDENCE OF CERVICAL NODE METASTASES ON CLINICAL EXAMINATION

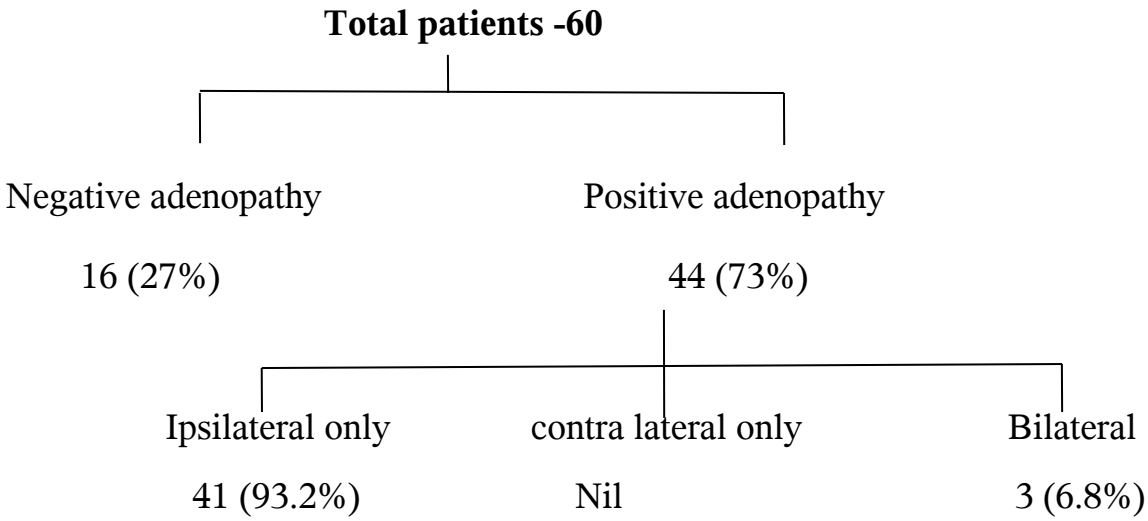

TABLE-II

Age	Total number of patients	Percentage
31-40 years	12	20%
41-50 years	33	55%
51-60 years	10	16.6%
61-70 years	5	8.3%

INCIDENCE OF PRIMARY

The most frequent site of the primary in the present series was the buccal mucosa (18 patients) which accounted for 30% of the head and neck cancers.(Table-III). Next in frequency was the anterior 2/3 rd of the tongue 11 patients (18.3%) and alveolus 7 patients (11.6%). Posteriorly situated cancers arising in the oropharynx showed a comparatively lower frequency

with the base of tongue having the highest 7 patients (11.6%). Overall the least frequent site was maxillary antrum 3 patients (5%)

TABLE –III

INCIDENCE OF CERVICAL NODE METASTASES BY SITE OF PRIMARY

Primary	No. of patients	%	No palpable nodes(N0) on admission	Palpable nodes (N+) on admission	% of (N+) patients
Buccal mucosa	18	30%	3	15	83.33%
Alveolus	7	11.6%	3	4	57.14%
Hard palate	3	5%	2	1	33%
Floor of mouth	4	6.6%	1	3	75%
Soft palate	3	5%	1	2	66%
Tongue ant 2/3 rd	11	18.3%	3	8	72.72%
Tongue post 1/3rd	7	11.6%	1	6	85.71%
Tonsil	4	6.6%	0	4	100%
Max. antrum	3	5%	2	1	33%

INCIDENCE OF NODAL METASTASES

Irrespective of sex, patients had clinical evidence of cervical node metastases on admission (Table –II). Bilateral nodes were present in 2 patients. 16 were negative for adenopathy.

Amongst the primaries, tonsils accounted for the higher incidence of node metastases (Table –III). All 4 patients with tonsillar carcinoma had palpable nodes on admission, accounting to 100 percent nodal involvement. Other posteriorly situated cancers also showed a similar pattern of behavior as compared to the anteriorly situated cancers with base of tongue and soft palate having 85.71% and 50% respectively. The least incidence of nodal metastases were from lesions of the hard palate and maxillary antrum.

DISTRIBUTION OF NODAL METASTASES

Analysis of the topographical distribution of cervical node metastases from various primary sites revealed as given below:

TABLE – IV

TOPOGRAPHICAL DISTRIBUTION OF CERVICAL NODAL METASTASTES FROM VARIOUS PRIMARY SITES

IPSILATERAL NODES ONLY

Buccal mucosa – submandibular node (main)

N0	N1	N2a	N2b	N2c
3	9	4	2	-

Alveolus (submandibular node)

N0	N1	N2a	N2b	N2c
3	2	1	1	_

Hard palate (submandibular node)

N0	N1	N2a	N2b	N2c
3	1	_	_	_

Floor of mouth - submandibular (main)

N0	N1	N2a	N2b	N2c
1	2	1	_	_

Soft palate (upper and middle cervical nodes)

N0	N1	N2a	N2b	N2c
1	2	-	_	_

Tonsils (Jugulodigatric nodes)

N0	N1	N2a	N2b	N2c
0	2	1	1	_

IPSILATERAL NODES AND CONTRALATERAL NODES

Tongue ant 2/3rd (upper deep cervical nodes)

N0	N1	N2a	N2b	N2c	N3
3	4	2	1	_	1

Tongue post 1/3rd (upper deep cervical nodes)

N0	N1	N2a	N2b	N2c	N3
1	2	1	1	_	2

Maxillary antrum (submandibular node)

N0	N1	N2a	N2b	N2c	N3
2	-	1	-	_	-

Carcinoma of the buccal mucosa predominantly metastased to the submandibular nodes. Only when very advanced (T4 with retro molar extension), they involve the upper deep cervical nodes. Sub mental node involvement was totally absent. Carcinoma of the alveolus predominantly metastased to sub mandibular nodes. Sub mental node involvement was infrequent.

Carcinoma of hard palate infrequently metastased. The only one patient, in whom this happened, had involvement of the ipsilateral submandibular node. The lower incidence of cervical metastases in patients with cancer of the hard palate has been ascribed in the literature to a less extensive lymphatic network in the immobile palate mucosa. Although the number of patients with hard palate cancer was small in the present series, our findings appeared to confirm with this explanation.

Carcinoma of the anterior two third of the tongue most commonly involved the upper deep cervical group followed by the submandibular group of nodes. In only one instance, the middle deep cervical nodes involved. Involvement of nodal groups at a lower level in the neck was not seen. As none of the primaries involved the tip of the tongue, predictably sub mental node involvement was absent. Bilateral nodal involvement was present in one instance with involvement of the contra lateral submandibular nodes.

Carcinoma of the floor of the mouth predominantly metastased to the ipsilateral submandibular nodes, inspite of the anterior location of the tumors and their proximity to the midline, sub mental node involvement was infrequent and contra lateral nodes were uninvolved at all.

Carcinoma of the soft palate commonly metastased to upper deep cervical nodes. Although it is a midline structure, the incidence of the bilateral nodal involvement was nil, possibly of the small numbers of patients involved in the present study.

TABLE –V

CORRELATION BETWEEN TUMOR SIZE AND CERVICAL NODE METASTASES

Tumor size(cm)	No. of patients	Total N0 %	Total N+ %	N1 %	N2 %	N3 %
0-2	18	10(55.55)	8(44.44)	5(27.77)	3(16.66)	0
2.1-4	32	8(25)	24(75)	16(50)	6(18.75)	2(6.25)
4+	10	-	10(100)	2(20)	7(70)	1(10)

Going by individual sites (Table-VII) all the patients who had tumors larger than 4cms in diameter with primaries situated in the buccal mucosa, alveolus, anterior 2/3rd of the tongue and the maxillary antrum had clinically palpable nodes on admission. Conversely majority of patients having tumors

smaller than 2cms with primaries in the same sites had a clinically negative node on admission.

TUMOR SITE AND ITS DIFFERENTIATION

The degree of differentiation of he primary varied according to tumor site (Table-VI). Majority of the anteriorly situated tumors i.e. those arising in the oral cavity, were well or moderately differentiated (55.55 and 26.66 percent respectively), whereas the bulk of those situated posteriorly i.e. in the oropharynx were moderately or poorly differentiated (26.66 and 53.33 percent respectively).

TABLE –VI

TUMOR SITE AND ITS HISTOLOGIC DIFFERENTIATION

Site	Total number	Well differentiated (%)	Moderately differentiated (%)	Poorly differentiated (%)
Anteriorly situated tumors(buccal mucosa, alveolus, hard palate, tongue ant 2/3rd, floor of mouth	45	25(55.55)	12(26.66)	8(17.77)
Posteriorly situated tumors(soft palate, tonsils, tongue post 1/3rd, maxillary antrum	15	3(20)	4(26.66)	8(53.33)

CORRELATION BETWEEN TUMOR DIFFERENTIATION AND NODAL METASTASES

The degree of differentiation, in turn, was found to influence the incidence of regional nodal metastases. Overall tumor differentiation showed an inverse relationship with the incidence of nodal metastases. Decreasing tumor differentiation was associated with increasing nodal spread (64.29 percent, 75 percent and 87.5 percent in cases of well, moderately and poorly differentiated tumors respectively). Conversely the number of patients who had clinically negative neck on admission showed a decline with increasing tumor grade 35.7 percent, 25 percent and 12,5 percent with well, moderately and poorly differentiated respectively.

TABLE-VII

CORRELATION BETWEEN TUMOR DIFFERENTIATION AND CERVICAL NODAL METASTASES

Degree of differentiation	No,. of patients	Total N0 %	Total N+ %	N1 %	N2 %	N3 %
well	28	10(35)	18(64.29)	16(57.15)	2(7.14)	-
moderately	16	4(25)	12(75)	4(25)	6(37.5)	2912.5)
poorly	16	2(12.5)	14(87.5)	4(25)	9(56.25)	1(6.25)

When both tumor differentiation and its site were considered together in relation to the incidence of node metastases, it was observed that majority of the anteriorly situated tumors were histologically well differentiated, and 33 to 83 percent of these tumors produced regional metastases. This was in contrast to the posteriorly situated tumors, majority of which were histologically moderate to poorly differentiated and gave rise to a high regional metastatic rate of 66 to 100 percent.

SUMMARY AND CONCLUSION

Squamous cell carcinoma of the head and neck is the most frequent malignancy encountered in India.

Depending upon the site of the primary, 73 percent of these patients already have palpable nodes in the neck when first seen. A significant percentage, in addition (20 percent according to one estimate) harbor occult nodal disease which manifest clinically at a later date often after the primary has been treated adequately.

The presence of the palpable regional lymph nodes markedly alters the prognosis of patients with head and neck squamous cell carcinoma by reducing the 5 year survival rate to less than half. Therefore treatments of the neck before regional nodes become clinically palpable may help to improve the local – regional control rate and the overall survival in these patients.

However, in view of the morbidity imposed by any form of additional treatment to the neck at the time treating the primary, especially when surgery is chosen as the modality. Its blanket use in all patients with head and neck primary has not been considered justifiable.

Selective use of the latter in patients harboring occult nodal disease, who are at higher risk of developing clinically palpable nodes despite adequate

treatment of primary, may be justified in the hope of improving the cure rate.

Because there is currently no way to identify occult disease in the cervical nodes other than removing and examining them histopathologically. Various features of the primary tumor (site, size, thickness, differentiation) have been correlated with the incidence of regional nodal disease, with objective of identifying the subset of patients likely to harbor occult regional nodal disease.

The present prospective study of 60 patients with proven squamous cell carcinoma at various sites of head and neck was undertaken to study the possible tumor factors which influences the incidence and the pattern of regional nodal metastases.

The aim of the study was to describe the age incidence, the incidence and topographical distribution of cervical nodal metastases from various primary squamous cell carcinoma of the head and neck and to correlate tumor size and differentiation with the incidence of nodal metastases.

The results were as follows:

1) Overall, 73 percent of the patients had palpable nodes in the neck on admission. The figure was slightly higher than that reported by western authors (57 percent, Lindberg 1972)

2) The mean age incidence was 50 years. 55% patients were in the age group of 41 to 50 years followed by 20% in the age group of 31 to 40 years. So an increase in the incidence of secondary node metastases was found in the 4^{th} and 5^{th} decades.

3) Site of the primary appeared to influence the incidence of regional nodal metastases. Posteriorly situated tumors arising in the oropharynx (base of tongue, tonsils, soft palate) displayed a greater propensity for regional metastases(66 – 100 percent) as compared to anteriorly situated tumors arising in the oral cavity(33 to 83 percent)

4) Amongst the posteriorly situated tumors, carcinoma of the tonsils showed the highest incidence of nodal metastases(100 percent)

5) Amongst the anteriorly situated tumors, carcinoma of buccal mucosa showed the highest incidence of node metastases (83.33%)

6) With regard to topographical distribution for any given primary, certain nodal groups in the neck were involved more frequently than others. Carcinoma arising in the buccal mucosa, alveolus, floor of

mouth, hard palate and maxillary antrum predominantly metastasized to the submandibular nodes, whereas those arising in the tongue (both anterior 2/3rd and posterior 1/3rd), tonsils and soft palate predominantly metastasized to the upper deep cervical group.

7) Although infrequent, bilateral metastases were observed more commonly in the carcinoma of base of the tongue and carcinoma of the anterior 2/3rd of the tongue.

8) Tumor size appeared to have bearing on the incidence of cervical node metastases. A progressive increase in the incidence of node metastases was observed with increasing tumor size 55.55 percent for lesions smaller than 2cm, 75 percent for lesions between 2-4cm and 100 percent for lesions larger than 4cm.

9) Tumor grade also appeared to influence the incidence of node metastasis. A progressive increase in the incidence of node metastasis was observed with increasing histological undifferentiation of the tumor (4.3 percent for well differentiated primaries, 75 percent for moderately differentiated primaries.

The above observations seem to suggest that large primaries (more than 4cm) and those with higher histologic grade (moderate to poorly differentiated) especially when situated in the oropharynx or the oral

tongue have a greater propensity for developing regional nodal metastasis compared to the rest.

These data could help to define the group of patients who are likely to harbor occult disease in their neck in the absence of clinically detectable nodes and for whom elective treatment of neck at the treatment of the primary may prove to be beneficial.

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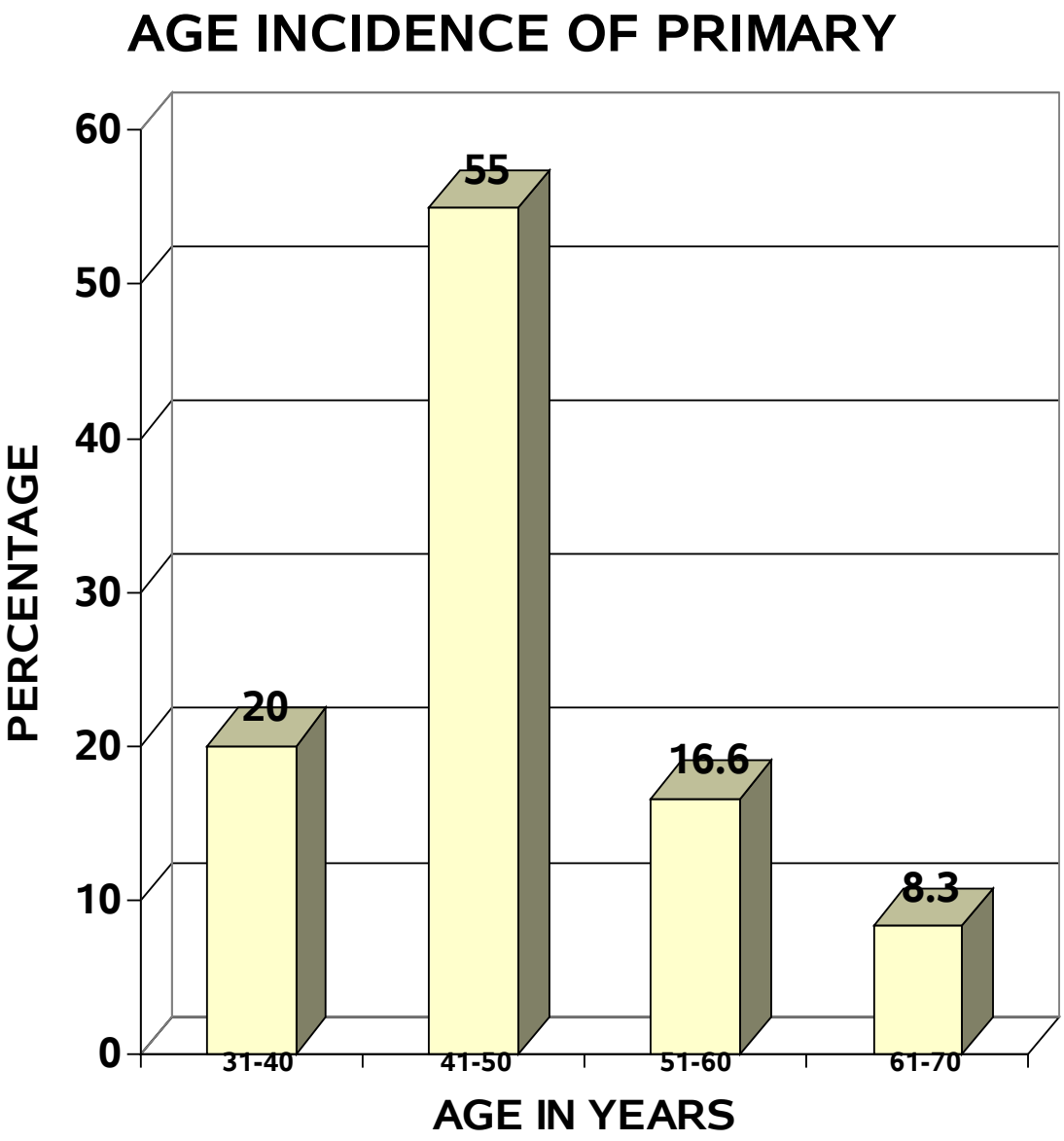
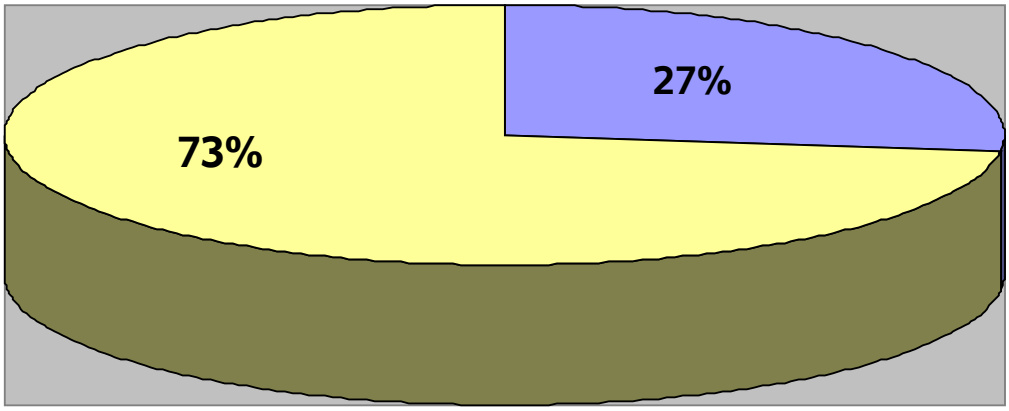
ANNEXURES

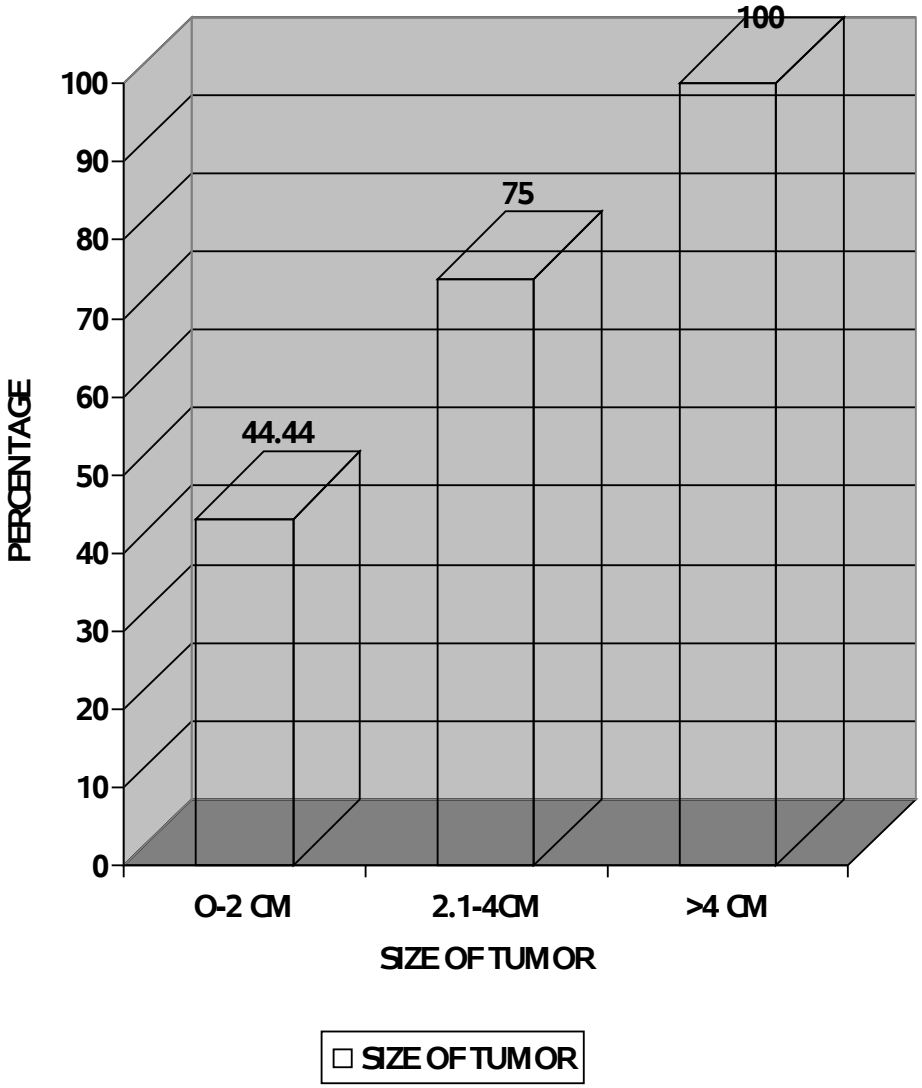
CHARTS


AGE INCIDENCE OF PRIMARY
60
50
40
30
20
10
0
PERCENTAGE
55
20
16.6
8.3
31-40
41-50
51-60
61-70
AGE IN YEARS

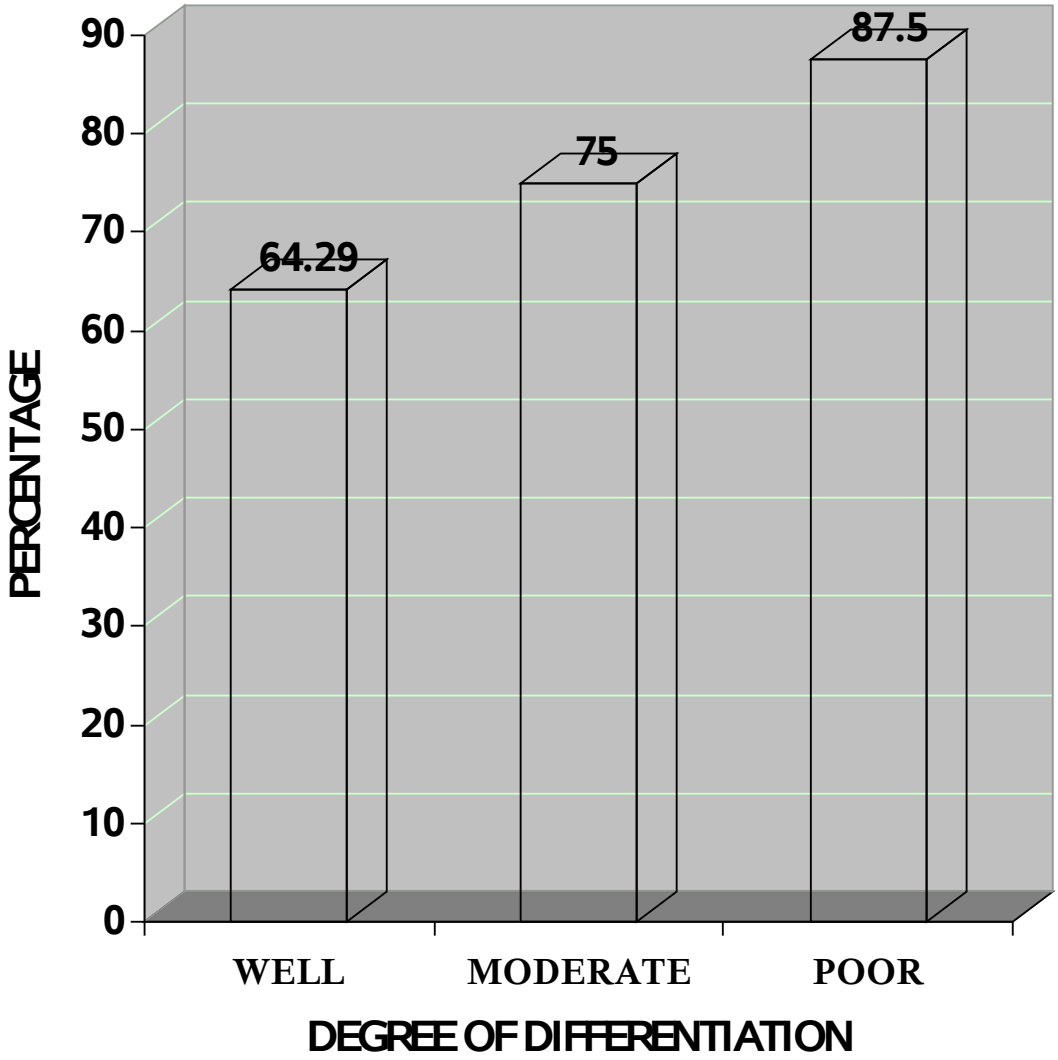
INCIDENCE OF CERVICAL NODE METASTASES



CORRELATION BETWEEN TUMOR SIZE AND CERVICAL NODAL METASTASES



CORRELATION BETWEEN DEGREE OF DIFFERENTIATION AND NODAL METASTASES



PROFORMA

Name of the patient:

AID no:

Age:

Sex:

Address:

H/O smoking:

H/O tobacco chewing:

H/O alcoholism:

H/O irradiation to head and neck in the past:

Complete physical examination:

Characteristics of primary tumor (site, extent, and size), macroscopic appearance (exophytic, endophytic or mixed), degree of local infiltration, T stage of tumor

Examination of neck:

to detect any palpable nodes, the side and triangle involved, the total number of nodes, groups involved, size(in cm), consistency, fixity, N stage of nodes

Biopsy:

MASTER CHART

SL. NO	NAME	AGE	SEX	IP.NO	DIAGNOSIS	NODE PRESENT OR ABSENT
1	Natarajan	56	M	6582	Ca. buccal mucosa	+
2	Visvanathan	65	M	8411	Ca. alveolus	+
3	Kandipan	49	M	10462	Ca. buccal mucosa	_
4	Sivalingam	40	M	1639	Ca. hard palate	+
5	Jeyaprakash	55	M	1654	Ca. buccal mucosa	+
6	Vinayagam	49	M	2874	Ca.maxillary antrum	+
7	Alagar samy	55	M	3305	Ca. buccal mucosa	_
8	Vijayakumar	50	M	3440	Ca. tongue ant. 2/3rd	+
9	Perumal	58	M	4175	Ca. soft palate	+
10	Kannadasan	49	M	271	Ca. buccal mucosa	+
11	Rajendran	56	M	4065	Ca. tongue ant. 2/3rd	+
12	Dharmalingam	51	M	3960	Ca.tonsil	+
13	Gunasekaran	50	M	3851	Ca.floor of mouth	_
14	Arokia samy	48	M	4445	Ca. soft palate	+
15	Raju	42	M	4438	Ca.tonsil	+
16	Kuppusamy	48	M	4981	Ca. buccal mucosa	+
17	Janakiraman	50	M	4735	Ca. soft palate	_
18	Pushparaj	34	M	5125	Ca. tongue post. 1/3rd	+
19	Subramani	54	M	5503	Ca. buccal mucosa	+
20	Annamalai	40	M	5049	Ca. tongue	+

					ant. 2/3rd	
21	Kariyaveeran	43	M	6106	Ca. buccal mucosa	+
22	Varatharaj	35	M	6194	Ca. alveolus	+
23	Rajagopal	62	M	6926	Ca. buccal mucosa	+
24	Venugopal	38	M	6485	Ca. tonsil	+
25	Rajagopal	43	M	6774	Ca. tongue ant. 2/3rd	_
26	Srivasan	40	M	6830	Ca tongue post 1/3rd	+
27	Narayana samy	49	M	7236	Ca tongue ant. 2/3rd	+
28	Uthrapathi	47	M	7244	Ca. buccal mucosa	+
29	Jayavel	34	M	7424	Ca floor of mouth	+
30	Sekar	44	M	8419	Ca. tongue post 1/3rd	+
31	Yuvaraj	33	M	8514	Ca alveolus	+
32	Krishna	32	M	8836	Ca. buccal mucosa	+
33	Balasubramani	60	M	9301	Ca.tongue post 1/3rd	+
34	Panner selvam	49	M	9544	Ca. floor of mouth	+
35	Rajagopal	50	M	2512	Ca. buccal mucosa	+
36	Anju	49	F	15218	Ca.alveolus	+
37	Kala	58	F	15830	Ca. tonsil	+
38	Shanthi	42	F	16384	Ca.hard palate	_
39	Roselin	65	F	16891	Ca tongue post 1/3rd	+
40	Vasantha	50	F	19077	Ca. tongue ant. 2/3rd	_
41	Parameswari	38	F	19914	Ca. floor of mouth	+
42	Maragatham	60	F	18326	Ca. alveolus	_
43	Nagamani	45	F	21749	Ca. buccal mucosa	+
44	Lakshmi	40	F	146	Ca. tongue	+

					ant. 2/3rd	
45	Selvi	37	F	23131	Ca. buccal mucosa	+
46	Kamalammal	65	F	23397	Ca. tongue ant. 2/3rd	+
47	Jothi	45	F	23724	Ca. maxillary antum	_
48	Krishnaveni	50	F	24308	Ca. alveolus	_
49	Guruvammal	48	F	24748	Ca. buccal mucosa	+
50	Lakshmi	41	F	25135	Ca.tongue post 1/3rd	_
51	Malliga	46	F	25484	Ca. buccal mucosa	+
52	Fathima	45	F	23406	Ca. tongue ant. 2/3rd	+
53	Inbavalli	50	F	27553	Ca. buccal mucosa	_
54	Kamala	45	F	28069	Ca. maxillary antrum	_
55	Saroja	62	F	1790	Ca. buccal mucosa	+
56	Vadivammal	44	F	2120	Ca. tongue ant. 2/3rd	_
57	Gouri	50	F	3148	Ca. alveolus	_
58	Polymmal	43	F	5230	Ca. tongue ant 2/3rd	+
59	Bakyam	45	F	2631	Ca. tongue post 1/3rd	+
60	Radha	44	F	5762	Ca. hard palate	_